

PCT application no.: PCT/US2005/008010

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IAP9 Rec'd PCT/PTU 07 SEP 2006Claims

What is claimed is:

1. A knee brace (10) for a user comprising:
5 a rigid arm (13) having a hinge assembly (19) near a midpoint thereof;
a semi-rigid cuff assembly (22, 25) connected to said rigid arm (13) and adapted to fit snugly about a leg of the user such that said hinge assembly (19) is adjacent
10 the user's knee;
at least one strap (28) for securing said knee brace (10) to the user's knee; and
a resilient liner (46) having a plurality of discrete liner segments (49), said resilient liner (46)
15 connected to an interior portion of said cuff assembly (22, 25) for providing a secure fit between said cuff assembly (22, 25) and the user's leg;
wherein at least one of said plurality of discrete liner segments (49) is removable, and said at least one
20 removable liner segment (49) is adapted to be secured between at least one of an upper cuff (22) and a lower cuff (25) of the cuff assembly (22, 25) and the thigh portion and calf portion, respectively, of the user.
- 25 2. The knee brace (10) of claim 1, wherein said semi-rigid cuff assembly (22, 25) is further comprised of a thermoplastic material and a deformable metallic material such that said semi-rigid cuff assembly (22, 25) is generally conformable to the user's leg.
- 30 3. The knee brace (10) of claim 1, wherein said upper cuff (22) has a first strap (28) for securing said upper cuff (22) to a thigh portion of the user, and said

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lower cuff (25) has a second strap (31) for securing said lower cuff (25) adjacent to a calf portion of the user.

- 5 4. The knee brace (10) of claim 3, wherein said at least one removable liner segment (49) conforms to the shape of at least one of the user's thigh portion and calf portion as the knee brace (10) is secured to the user by said first and second straps (28, 31).
- 10 5. The knee brace (10) of claim 1, wherein at least one of said plurality of discrete liner segments (49) further comprises a micro-porous waterproof cover material contacting the body portion of the user.
- 15 6. The knee brace (10) of claim 1, wherein at least one of said plurality of discrete liner segments (49) further comprises an electrode portion (58) operably connected to a source of electrical power such that electrical
- 20 stimulation is provided to the user's knee.
7. The knee brace (10) of claim 1, wherein at least one removable liner segment (49) is attached to one of said upper and lower cuffs (22, 25) via a hook and loop
- 25 fastener system.
8. The knee brace (10) of claim 1, wherein at least one of said plurality of discrete liner segments (49) is removably attached to said resilient liner (46).
- 30 9. The knee brace (10) of claim 1, wherein at least one of said plurality of discrete liner segments (49) has an adjustable shape.

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10. The knee brace (10) of claim 9, wherein said at least one discrete liner segment (49) having an adjustable shape further comprises a pair of adjustable segment portions.
11. The knee brace (10) of claim 10, wherein each of said pair of adjustable segment portions is individually adjustable.
12. The knee brace (10) of claim 1, wherein at least one of said plurality of discrete liner segments (49) has an adjustable size.
13. The knee brace (10) of claim 12, wherein at least one of said plurality of discrete liner segments (49) is inflatable or deflatable to provide said adjustable size.
14. The knee brace (10) of claim 1, wherein at least one of said plurality of discrete liner segments (49) further comprises an electrode portion (58) operably connected to a source of electrical power to impart therapeutic stimulation to an associated body portion of the user.
15. The knee brace (10) of claim 1, wherein:
said upper cuff (22) is hinged to said lower cuff (25),
said upper cuff (22) being adapted to be secured to adjacent a thigh of the user, and said lower cuff (25) being adapted to be secured adjacent to a corresponding calf of the user;
said hinge assembly (19) is located proximate the knee joint of the user; and

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said plurality of discrete liner segments (49) is adapted to be secured between each of said upper and lower cuffs (22, 25) and the thigh and calf, respectively, of the user.

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16. The knee brace (10) of claim 15, wherein said plurality of discrete liner segments (49) conforms to the shape of the user's thigh and calf as the knee brace (10) is secured to the user.

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17. The knee brace (10) of claim 1, wherein:
said lower cuff (25) includes a back plate (188); and
at least one of said plurality of discrete liner segments (49) is attached to said back plate (188).

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18. The knee brace (10) of claim 17, wherein at least one of said plurality of discrete liner segments (49) attached to said back plate (188) has an adjustable shape.

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19. The knee brace (10) of claim 18, wherein said at least one of said plurality of discrete liner segments (49) having an adjustable shape further comprises a pair of adjustable segment portions (182, 184).

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20. The knee brace (10) of claim 19, wherein each of said pair of adjustable segment portions (182, 184) is individually adjustable.

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21. The knee brace (10) of claim 20, wherein said pair of adjustable segment portions (182, 184) comprises a pair of cam portions defining a tibial crest groove (186) therebetween, said pair of cam portions being

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individually adjustable on either side of said tibial crest groove (186) to at least one of conform to a particular shape of a user's tibia and maintain the tibia in a desired position.

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22. The knee brace (10) of claim 1, wherein at least one of said plurality of discrete liner segments (49) has at least one of an adjustable shape and an adjustable size.

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23. The knee brace (10) of claim 22, wherein said at least one of said plurality of discrete liner segments (49) further comprises a pair of segment portions, at least one of said pair being movable to provide said adjustable shape.

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24. The knee brace (10) of claim 22, wherein said at least one of said plurality of discrete liner segments (49) is inflatable or deflatable to provide said adjustable size.

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25. The knee brace (10) of claim 1, wherein said at least one removable liner segment (49) is removably attached to said lower cuff (25) by a hook and loop fastener system.

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